Recognition Using CNN and Control VLC Hand Gesture Media Player

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Abstract: Hand gesture recognition systems received great attention in the recent few years because of their manifoldness applications and the ability to interact with machines efficiently through human-computer interaction. Due to the effect of lighting and complex background, most visual hand gesture recognition systems work only under restricted environment. With the rapid development of computer vision, the demand for interaction between human and machine is becoming more and more extensive. Since hand gestures are able to express enriched information, the hand gesture recognition is widely used in robot control, intelligent furniture and other aspects. One of the technical possibilities to implement hand gesture detection systems is to use the vision-based approach. The dataset uses all the required gestures. With all the features, an OpenCV and keas a hand gesture prediction model is built. The validation results indicate the precision and accuracy of the proposed model. The model is then used for controlling the VLC media player.

KEYWORDS: Hand Gesture Recognition,CNN, DeepLearning, VLCPlayer,Open CV

I. INTRODUCTION

Hand gestures are an important part of nonverbal communication and form an integral part of our interactions with the environment. Notably, sign language is a set of hand gestures that is valuable to millions of disabled people. However, deaf/dumb users experience difficulty in communicating with the outside world as most neither understand nor can use sign language. Gesture recognition and classification platforms can aid in translating the gestures to those who do not understand sign language. There are two major approaches in the classification of hand gestures. The first approach is the vision-based approach. This involves the use of cameras to acquire the pose and movement of the hand and algorithms to process the recorded images. Although this approach is popular, it is very computationally intensive, as images or videos have to undergo significant preprocessing to segment features such as the image's color, pixel values, and shape of hand.

Hand gesture recognition based human-machine interface is being developed vigorously in recent years. Due to the effect of lighting and complex background, most visual hand gesture recognition systems work only under restricted environment. To classify the dynamic hand gestures, we developed a simple and fast motion history image based method. In recent years, the gesture control technique has become a new developmental trend for many human-based electronics products. This technique let people can control these products more naturally, intuitively and conveniently. In this paper, a fast gesture recognition scheme is proposed to be an interface for the human-machine interaction (HMI) of systems. This paper presents some low-complexity algorithms and gestures to reduce the gesture recognition complexity and be more suitable for controlling real-time computer systems.

Aim:

Hand Gesture is one of the major factors in our communication society. There are lot of Sign languages that are actively present in the world. So we can't able to classify the action easily. So this project can easily classify the hand gesture which is used to control the VLC media player.

Objectives:

The goal is to develop a deep learning model for Hand gesture classification by convolutional neural network algorithm for potentially classifying the results in the form of best accuracy by comparing the CNN architectures.

Scope:

Hand Gesture images are collected. We have to train the machine to classify the types of gesture. This project contains different types of gesture like Thumbs Up, Thumbsdown, etc. We train to teach the machine to achieve the accuracy and get the possible outcome. Accessing VLC media player with the gesture.

II LITERATURE SURVEY

A literature review is a body of text that aims to review the critical points of current knowledge on and/or methodological approaches to a particular topic. It is secondary sources and discuss published information in a particular subject area and sometimes information in a particular subject area within a certain time period. Its ultimate goal is to bring the reader up to date with current literature on a topic and forms the basis for another goal, such as future research that may be needed in the area and precedes a research proposal and may be just a simple summary of sources. Usually, it has an organizational pattern and combines both summary and synthesis.   A summary is a recap of important information about the source, but a synthesis is a re-organization, reshuffling of information. It might give a new interpretation of old material or combine new with old interpretations or it might trace the intellectual progression of the field, including major debates. Depending on the situation, the literature review may evaluate the sources and advise the reader on the most pertinent or relevant of them. Loan default trends have been long studied from a socio-economic stand point.Most economics surveys believe in empirical modeling of these complex systems in order to be able to predict the loan default rate for a particular individual. The use of machine learning for such tasks is a trend which it is observing now. Some of the survey's to understand the past and present perspective of loan approval or not.

III EXISTING SYSTEM

Hand gesture recognition with surface electromyography (EMG) is indispensable for Muscle-GestureComputer Interface. The usual focus of it is upon performance evaluation involving the accuracy and robustness of hand gesture recognition. However, addressing the reliability of such classifiers has been absent, to our best knowledge. This may be due to the lack of consensus on the definition of model reliability in this field. This paper has raised a concern about model reliability in EMG-based hand gesture recognition. By defining the model reliability R as the quality of its uncertainty measures and providing an offline framework to investigate it, we have demonstrated that ECNN has great potential for classifying finger movements.

Drawbacks:
- Accuracy is low.
- Electromyography Signals are used to prepare the dataset.
- It is a complex process.

IV PROPOSED SYSTEM

We proposed a new and robust deep learning model based on a convolutional neural network (CNN) to automatically detect hand gesture movements. We used whole images, so it was not necessary to perform any pre-processing or the waste types, samples of more number of images are collected that comprised of different class data. Different hand movement's images are collected for each classes that was classified into input images. The DL method used in the study is the Convolutional Neural Network (CNN). It is predicted that the success of the obtained results will increase if the CNN method is supported by adding extra feature extraction methods and detection of hand gesture movements successfully. We are accessing VLC media player with the trained machine for hand gesture detection link opening presentation, moving to next slide, exiting presentation.

Advantages:

- Accuracy may be improvised.
- No signals are required to prepare the dataset.

V ENVIRONMENTAL REQUIREMENTS

MODULE DESCRIPTION

1. Data Preparation:
The dataset collection is the very important part of our project. The collection of the dataset is based on the hand posture. Using open CV we can access the live videos. With the help of open CV we record the videos frame by frame. First we record the videos one by one. And save the hand position data as a image in a folder. We repeat this process for the gestures which are needed for us.
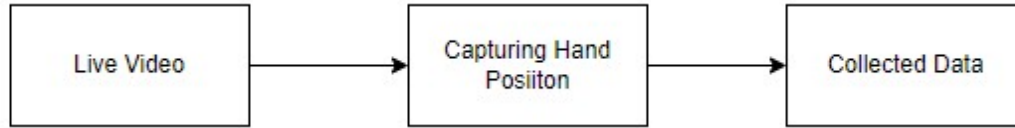
Module Diagram:

Fig 1: Data Preparation

Input: Video capture
Output: Data Collection

2. Implementing CNN architecture:

A Convolutional Neural Network (Convent/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other. The pre-processing required in a Convent is much lower as compared to other classification algorithms. While in primitive methods filters are hand-engineered, with enough training, Convent's have the ability to learn these filters/characteristics. The architecture of a Convent is analogous to that of the connectivity pattern of Neurons in the Human Brain and was inspired by the organization of the Visual Cortex. Individual neurons respond to stimuli only in a restricted region of the visual field known as the Receptive Field. Their network consists of four layers with 1,024 input units, 256 units in the first hidden layer, eight units in the second hidden layer, and two output units.

Input Layer:

Input layer in CNN contain image data. Image data is represented by three dimensional matrixes. It needs to reshape it into a single column. Suppose you have image of dimension 28 x 28 =784, it need to convert it into 784 x 1 before feeding into input.

3. Prediction of hand Gesture:

After training the model we have to use the trained model to use for deployment. In this deployment Aftermodel we use open to access the live video. It capture the videos and it will help to recognize the pattern and make it sequential data and those recognized data will flow through our trained model. Finally the model will predict the gesture and it will display the text based on the sign gesture.

Module Diagram:

Input: Input video
Output: Detection
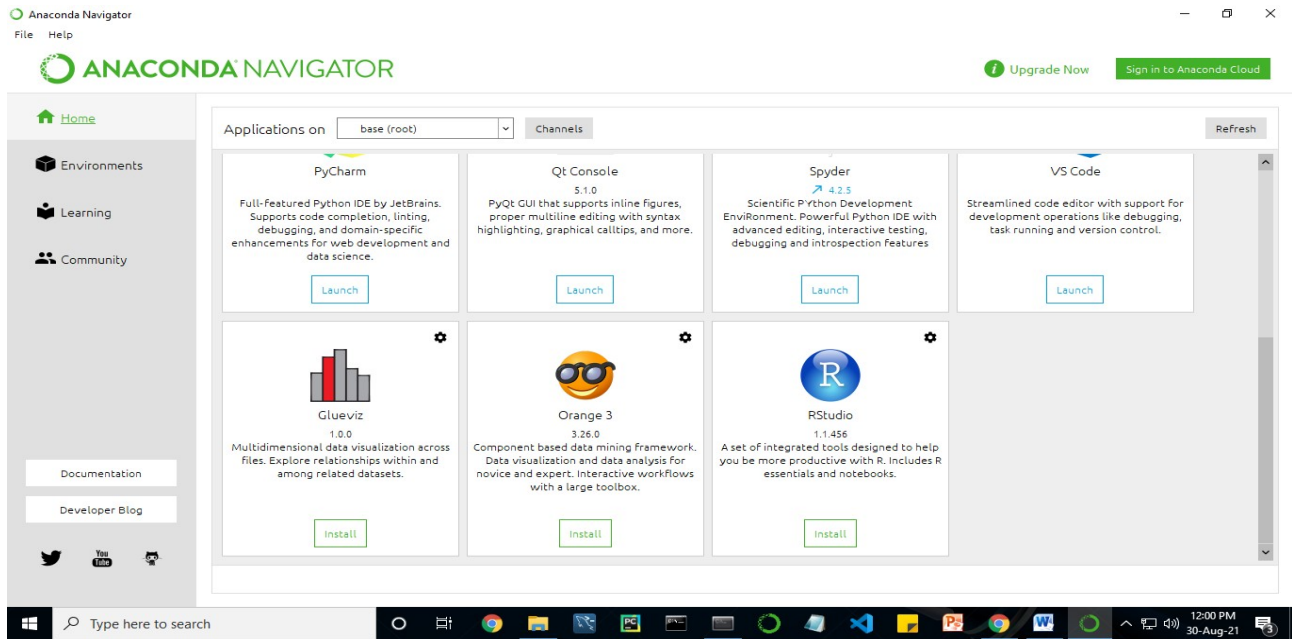
*Sample Input Screenshot***:**
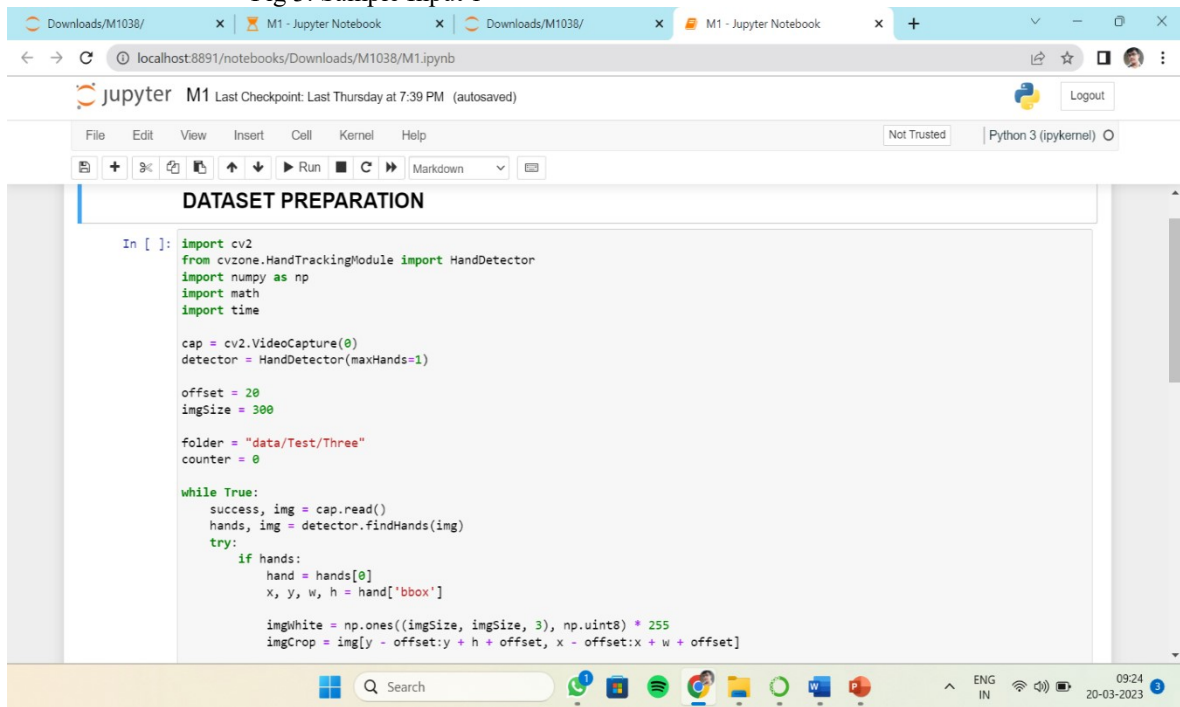
Fig 3: Sample Input 1

Fig 4: Sample Input 2

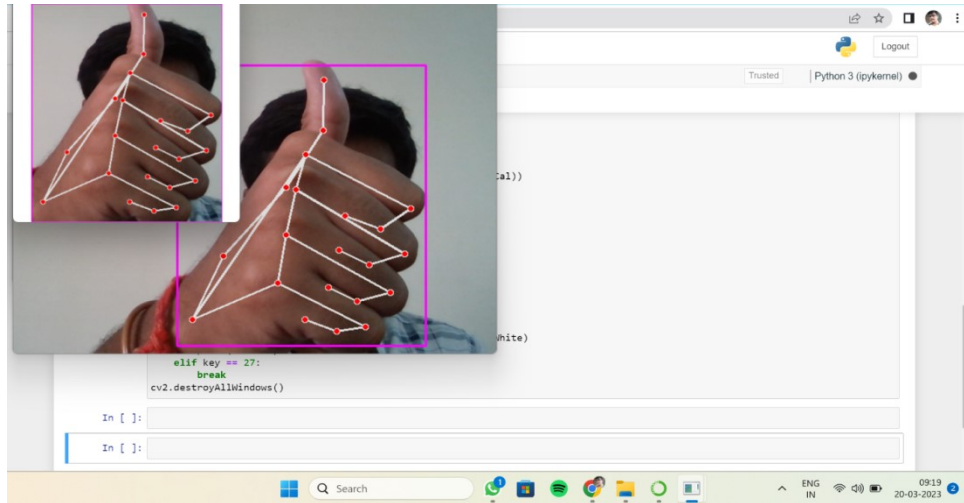**Sample Output Screenshot:**

Fig 4:Sample Output

VI   CONCLUSION

It focused how image from given dataset (trained dataset) in field and past data set used predict the pattern of different gesture using CNN model. This brings some of the following different live sign prediction. We applied NN where the accuracy and loss of the neural network makes better classification and the .h5 file is taken from there and that is deployed in real time. The .h5 model is used to detect the hand gesture and the gesture is used to control the VLC media player.

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